UNITED NATIONS

ECONOMIC
AND
SOCIAL COUNCIL

LIMITED

ST/ECLA/Conf.37/L.17
22 June 1971

ENGLISH
ORIGINAL: SPANISH

ECONOMIC COMMISSION FOR LATIN AMERICA

MEETING OF EXPERTS ON FORMULATION AND IMPLEMENTATION OF STRATEGIES FOR EXPORTS OF MANUFACTURES

Santiago, Chile, 26 July to 4 August 1971

Summary of study entitled

THE INDUSTRIAL SYSTEM AND EXPORTS OF MANUFACTURES *

Analysis of Brazil's experience

by
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Working document

* The study was carried out under the agreement extant between the Institute for Applied Research (IPEA) pertaining to the Ministry of Planning and Over-all Co-ordination of Brazil, and the United Nations Economic Commission for Latin America (ECLA), and is a provisional text. The author is Regional Adviser on Export Development Planning, attached to ECLA

71-7-1943

PART ONE

INTRODUCTION

1. Aims of the study

The following are the aims of the present study: (i) to furnish background data on particular characteristics of Brazil's industrial system, knowledge of which is considered to have a special bearing on the formulation of a long-term strategy for exports of manufactures; (ii) to attempt to deduce from these data some specific recommendations relating to such a strategy; and (iii) to formulate certain hypotheses and methodological suggestions for an analysis of the dynamism of Brazil's industrial system.

The points on which attention will be focused are as follows: size of industrial enterprises and establishments, concentration of the domestic market and of the market for exports, factors accounting for industrial productivity, procedures for importing technology, and behaviour of international enterprises (hereinafter referred to as IE).

The document contains an analysis of the interrelationship between these different aspects of the system, and between each individual aspect, and exports of manufactures. Since industrial exports depend basically upon the efficiency of Brazilian industry in relation to that of other countries, data are supplied which should make it possible to visualize Brazil's relative position at a time when one of its objectives is to gain a foothold in the world market for manufactures.

2. Content of the study

The content of the study is divided among seven chapters and a theoretical appendix.

The first chapter gives a general description of the methodology used. In the second, the size of industrial enterprises and establishments in the various sectors is analyzed, the situation of domestic enterprises is compared with that of IE, and data are presented on Brazil's position in relation to developed countries and to other Latin American countries.

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In the third chapter, industrial concentration in the various sectors is analyzed and related to productivity, regional distribution, the existence of IE, the rate of growth and exports of manufactures.

The aim of the fourth chapter is to determine the relative weight to be attached to sectoral and regional factors, plant size and existence of IE in accounting for disparities in industrial productivity.

The fifth chapter contains a study of the relation between imports of technology and exports of manufactures. The analysis covers the behaviour of enterprises with respect to local technological development, expenditure on importation of technology, and the part played by this imported technology in determining the attitude of enterprises to foreign trade.

In the sixth chapter, attention is concentrated on the role of the IE established in Brazil in relation to exports of manufactures. The exports of IE and of domestic enterprises are compared in respect of participation, volume per enterprise, technological content, degree of diversification, markets of destination, and dynamism.

On the basis of the data provided in the preceding chapters, an endeavour is made in the seventh chapter to formulate hypotheses on Brazil's industrial export prospects, and, as a corollary, to put forward proposals respecting export policy measures.

Lastly, in an appendix summing up the main characteristics of the industrial system analyzed in the foregoing seven chapters, an interpretation of the expansion mechanisms and patterns of IE is outlined and certain research topics are suggested which may make for a better understanding of the operation of Brazil's industrial system.

/PART TWO

PART TWO

MAIN CONCLUSIONS OF EACH CHAPTER

1. Size of enterprises and exports of manufactures

The basic purpose of this chapter is to analyze Brazil's position as regards the size of its industrial enterprises and establishments in relation to other countries in Latin America and to developed countries; to study the various situations arising within Brazil's industrial structure; and, lastly, to define the role played by the large enterprises in exports of manufactures and in the determination of their technological profile.

When Brazilian enterprises in a specific sector of industry make their debut in the world market, they have to face competition from IE, whose volume of activities is individually comparable or superior to that of the whole sector in Brazil's industrial structure.

Some of these international enterprises belong to small countries with limited natural resources, which, however, thanks to specialization, to their decision to concentrate effort on technological development and to a steady determination to face international competition, have gained an outstanding position in the world market. This applies in particular to the enterprises of Switzerland, Sweden and the Netherlands, to mention only the most representative examples.

Many of these IE possess subsidiaries in Brazil which constitute a minimal proportion of their whole organization: about 1 per cent, measured in terms of capital invested.

This places such subsidiaries at a significant advantage in competing with Brazil's domestic enterprises, on at least three counts: (i) the expansion of a domestic enterprise involves more risk for its shareholders than is implied for the shareholders of international enterprises by the expansion of their subsidiaries in Brazil; (ii) the subsidiaries have ready access to substantial financial resources; and (iii) they have ready access likewise to a diversified and tried technology meeting international standards of efficiency.

/Although subsidiaries

Although subsidiaries in Brazil represent tiny percentages of the international parent firms concerned, they are larger than the Brazilian enterprises, and play a preponderant part in a considerable number of sectors of industry.

The differences in size between industrial establishments in Brazil and in some of the developed countries are notably less than those observable in the case of enterprises.

This suggests that the Brazilian enterprises are less diversified in terms of numbers of plants per enterprise. Thus the difference would seem to lie in the volume of the enterprises' activities rather than in the scales of production of individual products.

There appears to be a measure of correlation between the characteristic size of establishments in a sector on the one hand, and, on the other, the participation of subsidiaries of IE, the degree of sophistication of the technology applied, and the rate of growth. The subject of this correlation will be taken up again in the following chapters.

The characteristic size of industrial plants seems to be much larger in Brazil and Mexico than in other Latin American countries (excluding Argentina). Brazil would appear to take first place when the characteristic size is measured in terms of employment and to come second when the value of production is the yardstick used, and its relative position seems to be more favourable in the "dynamic" than in the "traditional" sectors of industry.

The number of plants of characteristic size per industrial sector is, in most sectors, markedly higher in Brazil than in other Latin American countries. This is presumably attributable to its broader market, and, perhaps, to a lower degree of concentration. The latter may - on the assumption that the greater the concentration in the domestic market the less will be the entrepreneur's interest in tackling markets abroad - constitute a factor operating in favour of Brazil's position in the intra-regional market for manufactures.

/Inter-sectoral differences

Inter-sectoral differences in characteristic plant sizes seem to be the product of the production techniques applied in the sectors concerned. This suggests that the characteristic plant sizes in the various sectors may follow one another in much the same order in countries of different size, always provided that the technology is of common origin and that there are no substantial differences in the nature of the products manufactured by each sector in the various countries. It has been shown empirically that the order of industrial sectors by characteristic plant sizes is similar in Brazil, in some of the developed countries and in specific countries of Latin America. If a distinction is drawn between São Paulo and the rest of Brazil, it will be seen that the foregoing relation holds good only for São Paulo. In other words, everything seems to suggest that the technological structure of the sectors of industry is much the same in São Paulo as in the developed countries, whereas this is not true of the rest of Brazil.

Hence it is clear that setting aside the disparity in the size of enterprises and establishments and the distinction between national and international enterprises, there is little or no difference between the technological structure of industry in Brazil and the corresponding structure in countries supplying the world market for manufactures. It is similar but on a smaller scale.

The size of enterprises either exporting manufactures or importing technology in Brazil exceeds the average for the country. Those which undertake both activities simultaneously are larger still.

There seems to be a relationship between the volume of exports and the size of enterprises: i.e., not only are exporter enterprises bigger than the rest, but also, within the exporter group, the largest enterprises play a significant role.

2. Industrial concentration

The main findings of this chapter are outlined below.

Most of the sectors of industry in Brazil show high indices of concentration. In 176 of the 302 sectors defined in the study, the four largest establishments are responsible for more than 50 per cent of production.

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In the sectors with the highest indices of concentration, the avarage value of output is lower than in those where concentration is less marked. The proportion of production generated in sectors where the concentration index exceeds 50 per cent,(i.e., where the four largest establishments contribute 50 per cent of output or more) is 37.3 per cent.

The sectors in which concentration is highest absorb less labour in relation to their output than those where the degree of concentration is lower. Sectors with a concentration index of over 50 per cent account for 31.1 per cent of total employment.

Average productivity is higher in the most concentrated sectors than in the remainder. In sectors where the index of concentration is 75 per cent or more, average productivity is approximately 1.7 times that of sectors where the concentration index falls below 25 per cent.

In the larger establishments average productivity is appreciably higher than in the rest. The ratio between the two averages ranges from 1.5:1 to 2:1.

The bulk of Brazil's industrial exports comes from the sectors where concentration is less marked. Of their total value, 55.3 per cent derives from sectors in which the index of concentration is less than 25 per cent. These sectors show a higher export coefficient than the rest of Brazil's industry.

In the case of those branches of industry whose products have a greater content of technology, a major proportion of the exports effected is contributed by the sectors where concentration is most intensive. The largest establishments in each sector show a higher export coefficient than the rest, and account for most of their sector's exports.

More than half of Brazil's exports of manufactures consist of products in whose case the largest exporter enterprise contributes over 50 per cent of the total value exported. With respect to the great majority of the products sold abroad, the position is that the biggest exporter enterprise is responsible for more than 75 per cent of the value exported.

/Average concentration

Average concentration is higher in the sectors where the biggest establishments form part of IE than elsewhere. Those in which at least three of the four biggest plants belong to IE show a concentration index of 54 per cent. In the sectors where the four largest establishments are owned by domestic enterprises, the average index of concentration is 39 per cent.

If it is agreed to assume that the largest enterprises in each sector exert a significant influence on its orientation, the IE may be said to determine the course of a sizable proportion of Brazil's industrial activity. Twenty-six per cent of total manufacturing output is produced in the sectors where at least three of the four biggest establishments form part of IE. The proportion rises to 40 per cent in the sectors considered include those where at least two of the largest plants pertain to IE. Lastly, if the sectors in which one or more of the four biggest establishments belong to IE are taken into account, they will be found to generate 72 per cent of production.

The sectors in which the biggest establishments belong to IE provide less employment in relation to their output than the other sectors. Those in which three or four of the four biggest plants are the property of IE generate employment opportunities for 27 workers per million cruzeiros' worth of output. In those where one or two of the biggest establishments form part of IE, the corresponding number of workers employed is 37. Lastly, the sectors in which the four biggest establishments belong to domestic firms afford employment for approximately 46 workers per million cruzeiros' worth of production.

Most of Brazil's industrial output comes from sectors in which the biggest establishments are located in São Paulo. Those in which none of the four biggest plants is found in São Paulo generate only 3 per cent of manufacturing production. Sectors in which at least two of the largest establishments are installed in São Paulo account for 86 per cent of industry's total output.

The rate of growth is higher in the sectors where concentration is greatest than in the rest. Between 1960 and 1968 the growth rate of those sectors where the concentration index was 50 per cent or more outstripped that of industry as a whole by 13 per cent.

/The sectors

The sectors in which the biggest establishments belong to IE have expanded more than other sectors. Those in which the four biggest establishments form part of IE grew 26 per cent faster between 1960 and 1968 than did industry as a whole. The sectors in which the four largest establishments belong to domestic enterprises expanded 14 per cent less than industry in the aggregate.

3. Factors accounting for productivity

The purpose of this chapter is to take plant size sectoral and regional differences and the presence of international enterprises into consideration in the analysis of the productivity of the industrial labour force. Its specific aim is to determine the relative importance which can be ascribed to each of these factors in accounting for the differences in productivity observable in Brazilian industry. The analytic technique adopted is based on a concept taken from the statistical theory of information propounded by H. Thiel, by means of which the heterogeneous levels of productivity noted can be compared with a theoretical situation in which the productivity of all plants, whatever the sector and region to which they belong, is assumed to be the same.

According to the results obtained, inter-sectoral differences constitute the factor which does most to account for heterogeneous levels of productivity. Next follows diversity of plant sizes, and, lastly, the factor carrying least weight would seem to be the variations observable from one region to another within each sector. For example, greater differences in productivity are to be found between chemical-sector and textile-sector plants in Brazil as a whole, than between plants in São Paulo and in the rest of Brazil within either the chemical sector or the textile sector. In other words, the primary determinant of the productivity of a plant would seem to be the technology characterizing the sector to which it belongs.

To explain the inter-sectoral differences in productivity in their turn, the degree of participation of IE in each sector was introduced into the analysis.

/According to

According to the results obtained, the principal element in the inter-sectoral variations in productivity is the difference in this respect between the whole group of sectors in which foreign firms predominate and the sectors in which domestic firms are in the majority. Next would come differences among the pre-eminently domestic sectors, and, thirdly, disparities between the sectors where most of the enterprises are foreign. The findings of the present chapter suggest that the importation and development of technology and the role played by IE in Brazilian industry should be studied in greater depth.

The analysis of these two issues and their respective bearing on exports of manufactures is the object of the next two chapters.

4. Development of technology and exports of manufactures

The possibility open to domestic firms of purchasing guaranteed technology from abroad, the protection of domestic market, the limited competition within that market, its relative narrowness, the size of enterprises and the under-utilization of existing equipment are among the reasons why the national entrepreneur does not push for the autonomous development of technology.

In the case of IE, the basic limitations derive form the centralization of technological research in parent firms or subsidiaries in the developed countries and from the fact that the products manufactured in Brazil constitute only a fraction of the total range of products manufactured by the enterprise for the world market. This means that new products or processes which have already been tried out and used by the enterprise concerned can be transferred to its subsidiary in Brazil. In such circumstances, the probability that original RD activities will be initiated in Brazil is very slight indeed.

In theory, the importation of technology through domestic enterprises would seem to offer certain advantages over the transfer channel represented by the IE. In the first place, the range of possibilities for the selection of techniques is wider. An international enterprise transfers the technology that it possesses within its own organization. Greater freedom of choice may have direct repercussions on the cost of purchasing technology. Where

the IE are concerned, it is virtually impossible to determine what is really being paid for the transfer of know-how. Another advantage would lie in the possibility open to domestic firms of improving upon the imported technology and thus being able to compete in the developed countries' market. Obviously, IE subsidiaries would have less chance of doing this. Even if an international enterprise should happen to introduce an innovation in the Brazilian subsidiary, there is no guarantee that such a step would strengthen Brazil's competitive position and not that of the firm's country of origin.

How far the foregoing advantages are likely to materialize depends upon the key objective which the Brazilian entrepreneur has in mind when he decides to import technology. They will not do so if, as has been the case hitherto, his primary aim is to supply the domestic market. The entrepreneur who can transfer the cost of the imported know-how to the price of the product lacks the necessary incentive to select the technology with care, to dispute its cost and, lastly, to endeavour to improve upon it for export purposes.

Brazil's park of industries was established at a time when the country had no legislation to regulate imports of technology. The norms currently in force concentrate attention on the regulation of the corresponding payments and not on orientation with respect to sectoral priorities or more satisfactory procedures for the transfer of know-how. It may therefore be said that a genuine policy for the purchase of technology from abroad does not yet exist.

Brazil's expenditure on imports of technology, in relation to the value of its industrial production and to its gross product, is comparable to that effected by developed countries. In order to interpret the significance of this similarity, a comparison must be drawn between the different countries in respect of the sectoral structure of industrial production, the sectoral structure of imports of technology, and local expenditure on supplementing imported technology.

/A comparison

A comparison between Brazil and Japan brings to light the following dissimilarities: (i) the incidence on value added of the capital-goods sectors is greater in Japan, while that of the sectors manufacturing non-durable consumer goods is less. The former are characterized by a higher degree of technological sophistication than the latter; (ii) imported technology is concentrated to a greater extent in the capital-goods sectors in Japan. In Brazil, it is spread out more, and, relatively speaking, channelled more intensively into the sectors of manufacturing durable and non-durable consumer goods; (iii) the order of sectors by content of imported technology is similar in Brazil and Japan, but, those in which the content in question is greatest and least are farther apart in Japan than in Brazil. This may reflect the existence in Japan, and the relative lack in Brazil, of a technology policy designed to concentrate effort in specific sectors; (iv) in Japan, for every dollar spent by industry on purchasing technology, Japan four dollars are invested in technology research whereby the know-how obtained can be adapted and improved upon. This enables its manufactured products to compete in the markets of the very countries where the technology was purchased. In Brazil, expenditure on autonomous development of technology is estimated to be less than the amount spent on purchasing technology; (v) in Japan, the official agencies responsible for supervising the content of contracts relating to imports of technology are extremely strict in applying a policy aimed at encouraging domestic industry to compete in the world market. This policy is firmly supported by a highly export-conscious entrepreneurial sector. The existence of such export-consciousness seems to constitute an essential requisite for the application of a policy with respect to imports of technology like that pursued by Japan, the basic objective of which is to strengthen industrial efficiency by according privileges to specific sectors.

Analysis of the content of the technology imported by Brazil reveals the following points: (i) contracts for the use of trademarks are more numerous than those relating to manufacturing licences; (ii) less technology is absorbed by certain capital-goods sectors which are of decisive importance for the efficiency of the industrial system as a whole than by sectors producing non-durable and quasi-luxury goods (they are more constracts

/relating to

relating to beverages than to tractors and agricultural machinery, more for toilet articles, soap and candles than for machinery and tools, more for clothing and footwear than for transformers, etc.); (iii) 37.5 per cent of the contracts correspond to IE established in Brazil. This percentage underestimates the transfer of technology by these enterprises, since more than half of them have no contracts of this kind and nevertheless act as channel for the transfer of know-how; (iv) the vagueness with which the legislation in force defines the various procedures for the transfer of technology not only makes it difficult to analyze the content of such transfers in greater depth, but also handicaps the application of strict controls by the agency concerned.

If the structure of Brazil's imports of technology is compared with that of its industrial exports, the following inferences emerge: (i) those sectors where the content of imported technology is greatest contribute only a small proportion of exports; (ii) sectors whose degree of participation in foreign trade is higher than the average for industry as a whole absorbs little or no imported know-how; and (iii) since nothing much is done to develop technology by industry in Brazil, the foregoing observations imply that the bulk of Brazil's industrial exports are based on the use of technical know-how in wide currency. This implies a vulnerable competitive position in a market characterized, as is that of manufactures, by the rapidity with which innovations are introduced in products and processes.

Study of the behaviour of technology-importing enterprises in relation to exports of manufactures leads to the following conclusions: (i) the external sales of enterprises importing technology are made mainly to countries at similar or lower stages of industrial development; (ii) Brazil's exports of manufactures to developed countries are effected basically by enterprises which neither import know-how nor, apparently, undertake the development of technologies on their own account; (iii) most of the exports shipped to developed countries by domestic enterprises that import technology consist of products in respect of which Brazil's comparative advantage lies mainly in the availability of natural resources serving as the basis for their manufacture; (iv) the bulk of the exports to developed countries effected by the IE comprises, first, the simplest items in the

production range of the enterprise concerned; secondly, those products whose technology is partly outdated, and which are intended for the spare parts market; and, lastly, those based on the processing of natural resources which are plentiful in Brazil.

5. International enterprises and exports of manufactures

The main findings of this chapter may be summarized as follows.

Generally speaking, the IE are better equipped than the Brazilian enterprises to gain a foothold in the world market for manufactures.

In 1967, one out of every four IE established in Brazil carried on industrial export activities. In 1969, the proportion rose to one out of every three. This greatly exceeds the ratio observable in the case of the domestic enterprises. The proportion is higher in the "dynamic" than in the "traditional" sectors, although there are some signs that in the latter group the situation is beginning to change.

In 1967, the IE accounted for 33.8 per cent of Brazil's total exports of manufactures. In 1969 their contribution amounted to 43.3 per cent, and to 75 per cent in the machinery and motor-vehicle sectors.

In most sectors, a major proportion of exports (over 75 per cent) corresponds either to the IE or else to the Brazilian enterprises. There are few sectors in which the responsibility is shared by both groups. Furthermore, each category of enterprises exports mainly the products of those sectors in which it takes the lead.

The products exported by the IE seem to have a higher content of technology than the Brazilian firms' exports.

The volume of exports per enterprise is notably larger in the case of the IE than in that of the domestic enterprises. Seven out of every ten Brazilian firms and four out of every ten IE export less than 12,000 dollars yearly. One out of every two IE and four out of every five Brazilian enterprises show annual export figures of less than 25,000 dollars.

The behaviour of the IE in relation to the international market is more stable than that of the Brazilian firms. In both groups, the degree of permanence in the world market increases as the volume of exports expands.

/The bulk

The bulk of Brazil's exports of manufactures comes from firms characterized by a good deal of diversification, as regards both the number of products exported and the range of sectors to which they belong. Diversification is greater in the case of the IE than in that of the Brazilian enterprises, but the range of products falls within the manufacturing sector.

The IE sell a considerably larger proportion of their exports in the market of the Latin American Free Trade Association (LAFTA) than do the domestic enterprises.

The export sectors in which the IE are predominant expand a great deal faster than those in which Brazilian firms are the more numerous. The exports of the IE increase more rapidly than those of the domestic firms in all sectors, whether IE or Brazilian enterprises are the more numerous.

As as rule, subsidiaries established in Brazil are at a twofold disadvantage in relation to parent firms or subsidiaries in the developed countries that supply the world market for manufactures: they do not undertake technological research, and their scales of production are much smaller.

Generally speaking, however, subsidiaries installed in Brazil are in a more favourable position with respect to scales of production and degrees of processing than subsidiaries of the same enterprises established in other Latin American countries.

The size of enterprises seem to constitute a more important factor when the aim is to export to the developed countries than when the LAFTA market is the objective.

Given the assumption that the differences observable between the Brazilian firms and the IE that export manufactures reflect the general differences between these groups of enterprises, the following statements may be formulated in comparison with the domestic enterprises, the IE are larger, are predominant in sectors where the content of technology is greater, produce at higher levels of efficiency even when they belong to sectors in which they are not predominant, are more diversified, and expand more rapidly.

PART THREE

PROSPECTS FOR EXPORTS OF MANUFACTURES, AND POLICY CONCLUSIONS

With a view to stepping up the dynamism of Brazil's industrial export models, consideration should be given to the possibility of attempting to influence the IEs' export policy and at the same time to select priority export sectors in which to concentrate a special promotion effort. Proposals relating to each of these topics are put forward below.

1. Influencing the IEs' export policy

The export potential of the subsidiaries of IE established in Brazil appears to be much more significant in the various sectors than the exports they currently effect.

In relation to other developing countries, Brazil seems to be in an extremely favourable position to influence the export policy of the firms in question.

In exerting such influence the aim may not only be to enlarge the volume of exports, but also to channel a bigger share into the markets of the developed countries and, in addition, to increase the technological content of the products exported.

Special emphasis should be placed on action designed to influence the expansion projects of established firms, and any enterprises which it may be decided to install in the future. In the case of plants geared to the domestic market both in size and in the selection of the products manufactured, it is unrealistic to hope for substantial increases in exports.

The public-sector agencies which grant financing, give guarantees for obtaining credits abroad, approve tax exemptions in relation to the purchase of imported equipment, determine the domestic content index, and so forth, could perhaps take more decisive action than at present to stimulate export-consciousness on the part of the IE.

A possibility worth considering is that of tightening the linkage between remittance of profits and exports. Tax incentives already exist in connexion with the remittance of profits by IE that engage in export activities.

/As a

As a means of inducing the IE to rechannel their exports towards the developed countries, steps might be taken to encourage complementarity agreements between the subsidiaries established in Brazil and those installed in the developed countries. One specific possibility might be for firms to offset imports of parts from subsidiaries in developed countries against exports of other parts to the same subsidiaries. Hitherto, the trend seems to have been towards complementarity in respect of simpler parts among subsidiaries located in the LAFTA area, and importation of the more sophisticated parts from subsidiaries outside the region. This means that the dynamism of Brazil's exports is contingent upon the expansion of the LAFTA market.

To raise the level of technology in the products manufactured by subsidiaries in Brazil, selective criteria might be applied in determining domestic content indices. A lower domestic content index which implies the manufacture of relatively sophisticated parts may be more in the country's interest than a higher index which is reflected in the domestic manufacture of products which contribute nothing from the technological standpoint. The problems of scale which may arise in the manufacture of more sophisticated products in Brazil should be susceptible of solution within the framework of complementarity agreements among the subsidiaries of IE.

2. Selection of priority export sectors

It seems unrealistic to aim at stepping up the efficiency of industry in all sectors at once. Certain priority sectors would have to be selected for export purposes, and in these internal effort would be concentrated.

The attention devoted to such sectors would be additional to the action implicit in the general export promotion policy applicable to the sectors of industry as a whole.

The assignment of export priority status to specific sectors, is conditional upon the importance of their role in production for the domestic market. For example, Brazil can hardly be expected to specialize in exports of machinery for the processing of agricultural products, unless at the same time the industrialization of some part of its agricultural activities is set up as an objective.

/In selecting

In selecting priority sectors, it should be borne in mind that the initial stage will be a matter of creating veritable islands of efficiency in a sea of comparatively inefficient industries. This implies that the sectors which are most closely interrelated with other sectors of Brazil's industry will have more difficulty in improving their efficiency rapidly than the sectors which are "autonomous" in terms of inter-industrial relationships. The problem of efficiency in these latter arises basically within the industrial plants and in the relation between these and the transport, communications and energy infrastructure.

The counterpart of all this lies in the fact that the backward effects will be less marked in the case of those sectors which will be able to increase their efficiency faster, precisely because they are more independent of the other sectors. Where intermediate products are concerned, the forward effects may be significant.

Schematically, two types can be differentiated within this category of "autonomous" sectors: (a) those based on the processing of agricultural or mining products; and (b) those operating with a high coefficient of imported inputs, which are assembled in Brazil.

In the first instance, the comparative advantage to be exploited is the availability of raw materials; and in the second, the lower cost of labour.

Among the sectors which are largely dependent upon locally-manufactured industrial inputs, fairly careful study may usefully be devoted to those which are in addition labour-intensive. This group is of interest both from the standpoint of its power of "irradiation", and as regards the generation of employment opportunities. In outline, a distinction can be drawn between three sub-groups: (a) labour-intensive sectors with a low content of technology and minimum capital requirements, such as those producing clothes and toys, artisan-type industries, etc. Their products can be manufactured on a competitive basis by small and medium-sized enterprises; (b) labour-intensive sectors with a high content of technology and relatively small capital requirements, such as those producing electrical appliances for household use, optical apparatus, photographic equipment and others of the same sort. These items are generally manufactured by

/medium-sized and

medium-sized and large-scale industries, but they may give rise to subcontracting which will draw in a great many small enterprises; and (c) only relatively labour-intensive sectors (less so than (a) and (b)), with a high technology content and substantial capital requirements. This sub-group would include ship-building, the manufacture of buses and of railway rolling-stock, etc.

The capital/labour ratio in production of these goods is usually lower than in the so-called heavy industries (steel-making, the petro-chemical industry, cement manufactures, etc.). Induced effects on other sectors seem to be particularly important in the case of ship-building.

Another salient distinction, from the standpoint of export policy, relates to the degree of participation of Brazilian enterprises in the various sectors. In the "autonomous" category, food products, wood manufactures and steel-making may be cited as pre-eminently domestic industries. In the sectors which use industrial inputs manufactured in Brazil and in which domestic enterprises are in the majority, mention may be made of those producing machine-tools, agricultural machinery, equipment for the processing of agricultural products, clothing, footwear, etc. Only sectors for which the export prospects seem relatively favourable are listed here.

The difference in the speed with which the various sectors reach levels of efficiency comparable to international standards also has repercussions on the export volumes which they can attain over the short or medium term. The sectors defined as "autonomous" (categories (a) and (b) above) could perhaps be expanded more rapidly than those which are closely interrelated with local industry.

The foregoing remarks suggest that the pattern of exports of manufactures must be visualized as a sequence of different structures resulting from the superposition of groups of products which gradually emerge in the course of time. Thus, in the selection of priority sectors special importance attaches to forecasting the "lead times" of the efforts made in the various sectors.

In addition to the "lead times" it is obviously important to estimate the relative contribution to the total value of exports that the various sectors can make. In this connexion, the "autonomous" sectors linked to

/the processing

the processing of natural resources will probably have to bear the brunt of the responsibility for the expansion of exports, at least over the short and medium terms. In the case of steel-making, food products and wood manufactures, it would be a matter of creating export production capacity. The minimum period in which the exports of these sectors could be substantially increased is equivalent to the time required for the construction of large production units specifically designed with a view to exports. This implies that even if short-term decisions are adopted, the substantial increases referred to cannot be expected to materialize in less than five to ten years' time. Where wood manufactures and food products are concerned, long-term programming of supplies of the corresponding raw materials would have to be simultaneously undertaken.

The group of sectors in which the IE are predominant have no technological or market problems to face. Here the basic need is to induce these firms to modify their export policy in such a way as to give their subsidiaries in Brazil a bigger part to play in supplying the various markets in which the enterprises operate.

The volume of these firms' exports may attain significant dimensions. This will depend upon the procedures adopted by the Government to influence the enterprises in question and the vigour with which they are applied. Some procedures were suggested in section 1.

The sectors which are more highly labour-intensive and are characterized by a low technology content and limited capital requirements, and in which small- and medium-sized enterprises are the most numerous (those producing clothing and footwear have been mentioned as cases in point), pose problems essentially at the internal level, relating to co-ordination between enterprises, standardization of production and establishment of efficient marketing channels. The example of some of the Asian countries shows that sectors of this type can achieve sizable volumes of exports if solutions are found for the above-mentioned problems.

The scale of the employment that can be generated in such activities makes them particularly attractive in the context of export policy.

/The expansion

The expansion of these export sectors in foreign markets is faced with the barriers put up by the developed countries to protect their respective industries. In this connexion, the action taken by the Government at the international level may be decisive.

In the predominantly domestic sectors producing more sophisticated goods, among which reference has been made to machine-tools and equipment for processing agricultural and forest products, two main problems which are closely interrelated seem to arise: the necessity of concentrating major efforts on local development of technology and the imperative need for firms large enough to undertake strongly export-oriented activities. A matter of special importance in these sectors is the task of selecting a certain number of firms and concentrating in these a substantial volume of financial resources, technical assistance and marketing services, by means of which they can be converted into enterprises at the international level.

There are some sectors in which enterprises with export experience exist - a special case in point is that of machine-tools - which may exert a great deal of influence on collateral sectors, but which are unlikely to be able to play a significant role in the world market unless a decision to accord them intensive and unremitting support is adopted.

This need for national enterprises of international size exists in various sectors. What really matters is that the increase in the size of enterprises should be closely linked to the expansion of exports. Otherwise, encouragement would be given to intensified internal concentration which might imply higher rates of return on sales in the domestic market and, in the last analysis, a weakening of export-consciousness on the part of the enterprises concerned.

In Europe, mergers of enterprises take place within the framework of a virtually open and therefore highly competitive market.

The sectors in which the Government might take energetic action with regard to the development of technology would include, besides the two just mentioned, those producing processed foods and wood manufactures. In all four sectors technological research nuclei exist already, and might serve as a point of departure for the development of more far-reaching projects.

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Furthermore, these are sectors in which the technology available in the world market is not necessarily suited to local conditions. In the case of machine-tools and equipment for processing agricultural products, Brazil would have an opportunity of becoming a supplier of technologies specially adapted to the conditions prevailing in the less developed countries.

This selection of priority sectors in relation to local development of technology is perfectly compatible with the adoption of general measures designed to encourage technical progress in all sectors: for example, the granting of facilities to enterprises for sending technical personnel abroad and for engaging the services of specialists from outside the region; advisory assistance to enterprises in selecting and negotiating technical assistance contracts; establishment of documentation centres; tax incentives to encourage expenditure on technological research; and so on.

These measures are already being adopted by the Government agencies undertaking industrial promotion activities. In the case of priority sectors, action would entail direct collaboration with a selected group of enterprises in each phase of the production process: designing of products, designing of manufacturing processes and equipment, and even plant operation.

Once the priority sectors had been fixed upon, it would probably be useful to carry out studies dealing on an integral basis with activities ranging from the preparation of inventories of natural resources and raw materials to projects for the expansion of industrial plants or the establishment of new ones. In all likelihood, various parts of these studies are already available or in process of preparation by various public and private institutions. It would be of interest to assemble them, and to evaluate the scope and internal consistency of the sectoral export programme which would result from the aggregation of activities already programmed and/or initiated.

All this suggests that it might be desirable to form sectoral executive groups for exports, made up of representatives of public and private agencies. Their specific mission would be to formulate a long-term

sectoral export programme and to provide advisory services for the various public agencies which adopt decisions on the different questions relating to the sector's exports.

Given the assumption that in the long run the capacity to compete in the market for manufactures will depend upon the efficiency of industry as a whole and not on the existence of advanced and efficient sectors surrounded by inefficient industrial suppliers and consumers, the conclusion must be reached that one of the criteria to be borne in mind in selecting the priority sectors should be the necessity of gradually creating conditions which will promote the increased efficiency of the industrial system. In this connexion, an extremely important role may be played by the policy adopted in relation to the level, structure and evolution of customs tariffs for the protection of domestic industry. It seems unlikely that a globally efficient industrial system can be built up in the shelter of the levels of protection currently in force in Brazil.